

CLAIMS:

1. A process for producing printed material comprising an elongated web of flexible sheet material, the process including the process steps of:

printing an embossing coating on a surface of a major face of a web of said sheet material;

embossing the embossing coating printed on said major face by means of an optically variable device; and

metallising said surface of said major face with a metal coating,
to produce a web of flexible sheet material having a major face which is embossed, said major face being metallised,

the process being characterized in that
the printing and the embossing are carried out in-line and continuously until a desired length of the surface of the web has been embossed;

the web is advanced continuously past a series of work stations where the in-line process steps are respectively carried out, the series including a printing station where the printing of the embossing coating continuously takes place and an embossing station, following the printing station, where the embossing continuously takes place;
the printing of the embossing coating is on a portion of said surface of said major face;
and

the metallising is of the entire surface of said major face,
so that said major face of the web is partially embossed, the whole of said major face being metallised.

2. A process as claimed in Claim 1 characterised in that the flexible sheet material is a transparent flexible polymeric plastics film.

3. A process as claimed in Claim 1 or Claim 2, characterised in that it includes the further step of colour-printing said major face of the web, the colour-printing being carried out continuously and in-line with the printing of the embossing coating and in-line with the embossing.
4. A process as claimed in Claim 3, characterised in that the colour-printing is confined to at least one unembossed portion of the surface of said major face.
5. A process as claimed in Claim 3 or Claim 4, characterised in that the colour-printing is by means of a printing cylinder using a gravure printing technique.
6. A process as claimed in Claim 5, characterised in that the colour-printing cylinder forms part of a gravure printing press.
7. A process as claimed in any one of Claims 3 to 6 inclusive, characterised in that the colour-printing is carried out prior to the printing of the embossing coating.
8. A process as claimed in any one of the preceding claims, characterised in that the metallising step and any additional process steps, other than in-line printing and embossing steps, are carried out batchwise.
9. A process as claimed in any one of the preceding claims, characterised in that the embossing by means of an optically variable device is selected from the group consisting of holographic embossing, stereographic embossing, diffraction grating embossing, dot matrix embossing and combinations thereof.

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10. A process as claimed in Claim 9, characterised in that the embossing is holographic embossing.
11. A process as claimed in any one of the preceding claims, characterised in that the embossing is such as to provide the embossed web with an at least partially repeating embossed pattern.
12. A process as claimed in any one of the preceding claims, characterised in that it includes the further process step of laminating the embossed metallised web with a backing web of flexible sheet material, to provide a laminated composite material, in which the embossing, the metal coating and any colour-printing are sandwiched between the webs so that the embossed metallised web is reverse-printed, at least one of the webs being transparent.
13. A process as claimed in any one of the preceding claims, characterised in that it includes the steps of slitting the embossed metallised web lengthwise into at least two strips, and rolling said strips into rolls.
14. A process as claimed in any one of the preceding claims, characterised in that each said web is made of a polymeric material selected from the group consisting of polyesters, polypropylenes, polyethylenes and polyvinyl chlorides, and mixtures, blends and copolymers thereof.
15. A process as claimed in Claim 14, characterised in that the polymeric material is selected from polyesters and polypropylenes, the metallising being by vacuum metallising.

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16. A process as claimed in any one of the proceeding claims, characterised in that the metallising step is carried out by means of aluminium.
17. A process as claimed in any one of the preceding claims, characterised in that the embossing coating is solvent-based, the embossing coating being printed by means of a printing cylinder.
18. A process as claimed in Claim 17, characterised in that the embossing coating is provided by the printing cylinder using a gravure printing technique, the cylinder forming part of a gravure printing press.
19. A process as claimed in any one of the preceding claims, characterised in that the embossing is by means of an embossing cylinder, carrying a holographically engraved cylindrical surface.
20. A process as claimed in Claim 19, characterised in that the embossing cylinder forms part of a gravure printing press.
21. A process as claimed in any one of the preceding claims, characterised in that the embossing step and each printing step are carried out by separate cylinders forming part of a single gravure printing press.
22. An apparatus or installation (10) for producing printed material, the apparatus or installation comprising a plurality of process stations (24, 32, 40), the process stations including:
an embossing coating printing station (24) for printing an embossing coating on

a surface of a major face of an elongated web of flexible sheet material;

an embossing station (32) for embossing the embossing coating printed on the web at the printing station; and

a metallising station (40) for metallising said surface of said major face, the apparatus or installation being characterised in that:

the printing station and the embossing station are arranged in-line;

the apparatus or installation is arranged and constructed continuously to advance an elongated web of flexible sheet material in succession past said printing station and said embossing station; and

the embossing coating printing station is for printing the embossing coating on a portion of said major surface of the major face.

23. An apparatus or installation as claimed in Claim 22, characterised in that it is arranged and constructed to advance the elongated web of flexible sheet material past the embossing station and then to the metallising station.

24. An apparatus or installation as claimed in Claim 23, characterised in that it includes at least one colour-printing station (16), arranged in-line with the embossing coating printing station and the embossing station, for colour-printing a coloured coating on an uncoated portion of the surface of said major face.

25. An apparatus or installation as claimed in any one of Claims 22 to 24 inclusive, characterised in that each processing station (40, 48, 56), other than said printing stations and embossing station, is arranged for batchwise processing of the web.

26. An apparatus or installation as claimed in any one of Claims 22 to 25 inclusive,

characterised in that each printing station and the embossing station form part of a single gravure printing press having a plurality of cylinders, each printing station and the embossing station being arranged in-line and each comprising one of the cylinders of the press.

27. An apparatus or installation as claimed in any one of Claims 22 to 26 inclusive, characterised in that the metallising station comprises a vacuum-metallising station, for vacuum-metallising the major face.

28. An apparatus or installation as claimed in any one of Claims 22 to 27 inclusive, characterised in that it includes a laminating station (48) for laminating said major face of the web, after the metallising, to a backing web of flexible sheet material.

29. An apparatus or installation as claimed in any one of Claims 22 to 28 inclusive, characterised in that it includes a slitting station (56) for slitting the metallised web into portions.

30. An apparatus or installation as claimed in any one of Claims 22 to 29 inclusive, characterised in that it includes a rolling station for rolling each metallised web or web portion up into at least one roll.